

## Categorization of Hospital Emergency Services

TO THE EDITOR: R. Myles Riner, MD, and colleagues are to be commended for their work reported in the November issue, "Categorization of Hospital Emergency Services."<sup>1</sup> Lest we suddenly all jump to the tune of categorization, however, there is something we must realize—no one has demonstrated that for all its cost and trouble, categorization really saves lives and reduces morbidity.

No matter how elegant the categorization scheme, the actual process involves empowering a state or county agency to demand of local hospitals and physicians the filling out of endless surveys and the attending of required meetings, necessitating, in turn, countless hours of administrative and physician time at the local hospital level—time and money that should perhaps be better spent on direct patient care.

In our local area of California, for example, we have had a categorization scheme of sorts since around 1982, when a regional trauma system was set up. Despite this, not one shred of evidence has been published to date showing that our trauma system in a semiurban and rural area of California desert has significantly altered the outcome of even one case. In fact, the local emergency medical services (EMS) agency that spent who knows how many thousands of dollars has been so inept, in the opinion of Riverside County, that the county "seceded" this month from the regional system.

This is the danger of categorization—no matter how well conceived, it fosters government bureaucracy. Let us rather first prove that it really makes a difference to emergency care. Then, even if it does, let us calculate the cost/benefit ratios of this categorization, taking into account physician and hospital time needed to set up the system. Then and only then should we start "categorizing."

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## Prognostic Factors in Hypoxic-Ischemic Coma

TO THE EDITOR: The Specialty Conference, "The Neurologic Sequelae of Cardiac Arrest," by W. T. Longstreth, Jr, in the August 1987 issue<sup>1</sup> describes the results of the author's multivariable predictive rule in assessing neurologic outcome after cardiac arrest. Analysis of clinical variables, including pupillary reaction to light, spontaneous eye movements, motor response to pain, as well as serum glucose levels, is successful in identifying patients with very good or poor chances of awakening. However, the scale is less reliable in predicting an unfavorable outcome in patients with cutoff scores greater than 4—which occurred in 44 of 217 patients (20%) without missing values.<sup>2</sup> Levy, whose editorial on this subject appears in the same issue,<sup>3</sup> described a 41% incidence

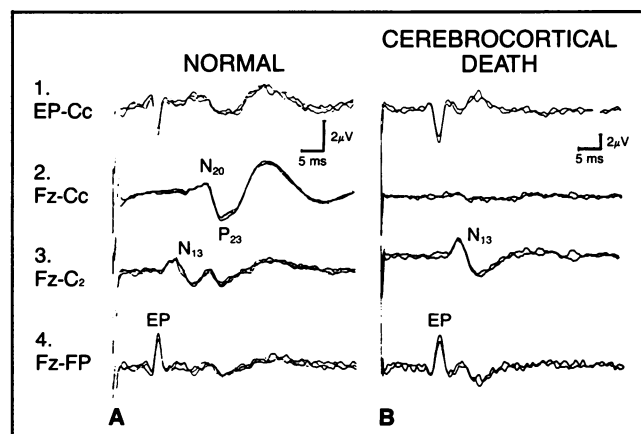
of mortality or persistent vegetative state in a subgroup of 210 patients in hypoxic-ischemic coma with intact pupillary responses, flexor motor function or better, and spontaneous eye movements.<sup>4</sup> These results suggest that clinicians cannot accurately predict unfavorable outcome after cardiac arrest from scales that rely upon preserved brain-stem responses.

Because there is selective vulnerability of the adult cerebral cortex to anoxia, some patients are destined to die without awakening despite brain-stem function because they have sustained irreversible destruction of the cerebral cortex or cerebrocortical death. We have found that bilateral absence of cortical evoked responses is an early guide to this condition and reliably predicts unfavorable outcome (T.L. Rothstein, MD, E.M. Thomas, CRET, S.M. Sumi, MD, unpublished data, June 1983 to June 1987) (Figure 1).

Our study investigated 42 patients in hypoxic-ischemic coma to establish prognostic indices. Patients unconscious at least six hours following cardiac arrest were studied clinically and electrophysiologically with electroencephalogram (EEG), brain-stem auditory evoked response (BAER), and median nerve somatosensory evoked potential (SSEP).

Outcomes were characterized by four clinical groups. Twelve patients (29%) awakened and had normal neurologic findings, including normal or rapidly normalizing SSEP. Seven patients (16%) awakened but recovered with varying degrees of motor or cognitive impairment. They had bilaterally delayed central conduction times or reduced amplitudes of cortical response. A third group consisted of 13 patients (31%) with normal brain-stem reflexes who survived 4 to 64 days without awakening. Somatosensory evoked potential measurement was abnormal in all, with absence of cortical responses in eight and delayed or attenuated responses in five. The final group of ten patients (24%) had no brain-stem reflexes, electrocerebral silence, and bilateral absence of cortical evoked responses; this group fulfilled criteria for brain death.<sup>5</sup>

Brain-stem reflex activity and BAER predicted a favorable



**Figure 1.**—Somatosensory evoked potentials recorded from the scalp and neck of a normal subject after median nerve stimulation at the wrist (A) and from a 78-year-old patient within 24 hours after cardiac arrest (B). In B there is preservation of the brachial plexus (EP) and cervicomedullary activity (N13) but no identifiable N20/P23 cortical potential in the Fz-referenced contralateral cortex (Fz-Cc) as recorded in channel 2. In addition to pseudolaminar necrosis of the cortex, there was severe neuronal loss in the thalamus at necropsy.

outcome in mild cases and an unfavorable outcome in patients whose responses were absent, indicating brain death, but failed to identify unfavorable outcome in 13 of 42 patients (31%), including 8 patients (19%) who sustained cerebrocortical death. Bilateral absence of cortical evoked responses proved an accurate discriminator. Four patients in this group underwent neuropathologic examination and showed widespread cortical and thalamic destruction, with acute ischemic changes of cortical neurons in those of short survival and frank necrosis of the pseudolaminar type after longer survival.

Patients with bilaterally delayed or attenuated cortical responses had an uncertain prognosis, as some died without awakening. One patient in this group underwent neuropathologic examination and was found to have widespread laminar necrosis with islands of preserved parietal cortex.

Electrocerebral silence reliably predicted unfavorable outcome but was found on initial examination in only 13 of 23 patients (57%) who died without awakening.

Previously reported prognostic factors in hypoxic-ischemic coma such as age, cardiac mechanisms, hypotension, serum glucose levels, and EEG abnormalities other than electrocerebral silence would not have predicted poor neurologic outcome in our patients. While cerebrospinal fluid creatine kinase BB isoenzyme values generally correlated with the extent of brain damage and with neurologic outcome, two of six patients who died without awakening had misleadingly low values.

Our results suggest that conventional scales that rely upon residual brain-stem function will fail to identify patients who have sustained severe and irreversible damage to the cerebral cortex who will not awaken. Bilateral absence of cortical evoked potentials is the most reliable early guide to unfavorable outcome in hypoxic-ischemic coma.

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## Public Health in California

TO THE EDITOR: Here are two public health concerns that we wish to bring to the attention of your readers.

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### Record Increase of Syphilis in California

In the past 18 months, California has experienced a major increase in the number of reported cases of primary and secondary syphilis. Health care providers should be aware of this increase so that appropriate diagnostic and therapeutic interventions can be undertaken.

During the past five years, the incidence of primary and

TABLE 1.—Change in Incidence of Primary and Secondary Syphilis From 1983 to 1986 According to Population Group

Population Group	Change in Incidence	
	Cases	Percent
White males . . . . .	-1,147	- 55
White females . . . . .	+ 90	+ 52
Black males . . . . .	+ 515	+ 52
Black females . . . . .	+ 544	+233
Hispanic males . . . . .	+ 435	+ 33
Hispanic females . . . . .	+ 190	+105

secondary syphilis in California, as a whole, has not reflected the successive yearly decreases that have been reported for the nation. Small fluctuations in incidence were observed from 1982 through 1985, but in 1986 a 35% increase in cases was reported, with a record number of cases (5,897) being reported for the year. Likewise, in the first six months of 1987, reported cases of primary and secondary syphilis were 51% greater than for the first six months of 1986 (3,641 versus 2,412).

Eight of California's 61 local health jurisdictions reported significant increases (over 20 additional cases) for the first six months of 1987, compared to 1986. These were the counties of Contra Costa, Fresno, Los Angeles, Sacramento, San Bernardino, San Diego, and Tulare, and the city of Long Beach.

Conversely, four major jurisdictions reported significant decreases: the counties of Orange, San Joaquin, Santa Clara, and San Francisco. These reductions were achieved predominantly in high-risk populations—that is, homosexuals or Spanish-speaking undocumented single men (whose infections usually result from sex with prostitutes), or both. Successive yearly decreases have been noted in San Francisco from 1982 through 1986 and have been ascribed to acquired immunodeficiency syndrome (AIDS)-related education campaigns for safer sex practices.

Except for white men, in whom the incidence of primary and secondary syphilis has declined in recent years, increases have been reported in all other major population groups in California since 1983 (Table 1).

Of considerable concern is that case investigations have revealed an ever-increasing association between substance abuse and the incidence of syphilis throughout the state, and, notably, more cases are being identified in young women who engage in part-time prostitution for cocaine—especially "crack" cocaine. The reason for this emerging sex-for-cocaine association probably is due to cocaine's relatively short-lived effect, which requires the user to engage in sex-for-cocaine more frequently. Further, women engaging in part-time prostitution have a greater likelihood of contracting sexually transmitted diseases.

Also of great concern is the sudden and unprecedented increase (79%) in the number of cases of congenital syphilis reported in 1986, with the number of California newborns having definite or probable congenital syphilis rising from 34 in 1985 to 60 in 1986. The increased incidence in black newborns was even more pronounced: 700% (3 cases in 1985 to 24 in 1986). The possible relationship of this to changes in the number of pregnant women having no or delayed prenatal care warrants further investigation. Clearly, practitioners need to perform serologic tests in their pregnant patients, repeating them at each trimester, if indicated, and to be especially vigilant for lesions that might reflect syphilis.